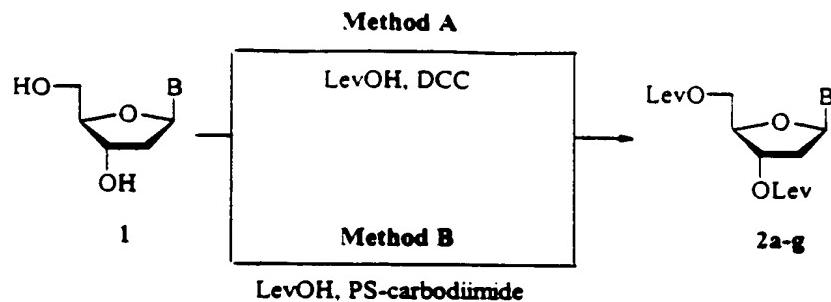


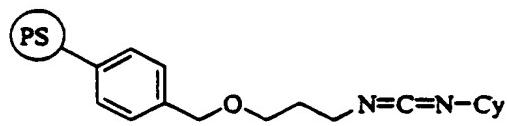
1/4



a, B= T; b, B= C; c, B= C^{Bz}; d, B= A; e, B= A^{Bz}; f, B= G; g, B= G^{iBu}

Method A: LevOH, DCC, DMAP, Et₃N, 1,4-Dioxane.

Method B: LevOH, PS-carbodiimide, DMAP, DMAP•HCl,
Et₃N, 1,4-Dioxane.



PS-carbodiimide

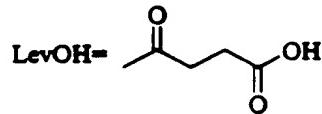
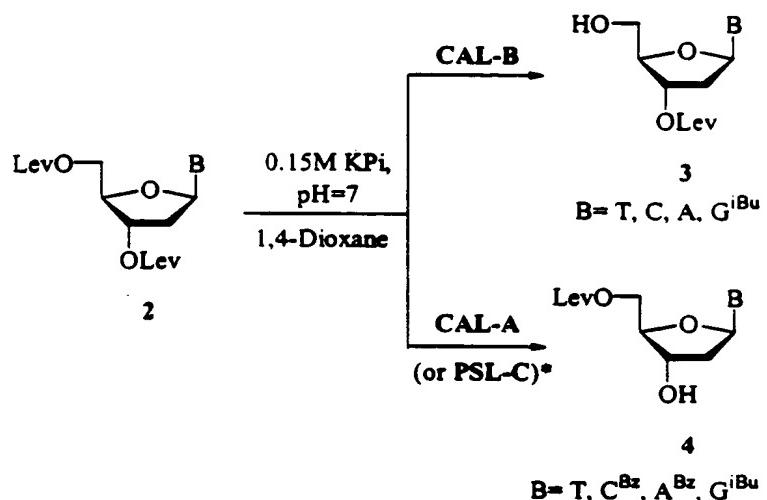


FIGURE 1

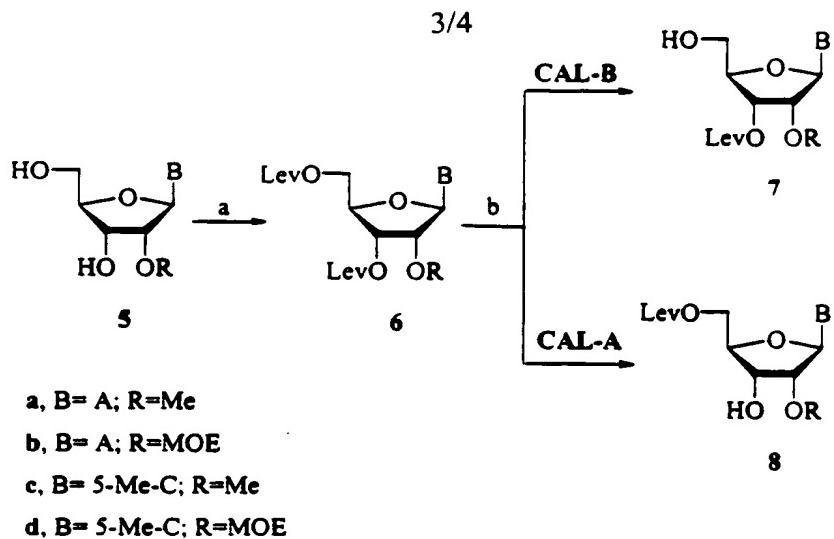
2/4



*PSL-C was used for di-Lev-dG^{iBu} (2g) since CAL-A did not catalyze the hydrolysis.

FIGURE 2

Docket No.: ISIS-5297
 App No.: Not Yet Assigned
 Filed: Herewith
 Title: BUILDING BLOCKS FOR THE SOLUTION PHASE SYNTHESIS OF
 OLIGONUCLEOTIDES
 Inventors: Yogesh S. Sanghvi; Vincente Goto; Miguel Ferrero; Susana Fernandez; Javier E.
 Garcia
 Attorney: Jeffrey H. Rosedale
 Phone: (215) 568-3100
 Sheet 3 of 4



- (a) LevOH, DCC, Et₃N, DMAP, 1,4-dioxane.
 (b) 0.15M KPi (pH=7), 1,4-dioxane.

FIGURE 3

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Table 1. Regioselective Enzymatic Hydrolysis of di-Levulinyl esters 2.

entry	substrate	enzyme	T (°C)	t (h)	Yield (%) ^a	
					3	4
1	2a	CAL-B ^b	40	62	85	
2	2b	CAL-B	30	62	84	
3	2d	CAL-B	40	28	98	
4	2g	CAL-B ^c	40	18	80	
5	2a	CAL-A ^b	40	86		70
6	2c	CAL-A ^b	40	62		78
7	2e	CAL-A	40	68		85
8	2g	PSL-C	60	28		93

^a Isolated yield.

^b An extra fraction of lipase (30 mg) was added after 30 h.

^c It was used a ratio of 1:2 w/w (2g/CAL-B).

a. B= T; b. B= C; c. B= C^{iBu}; d. B= A; e. B= A^{iBu}; f. B= G; g. B= G^{iBu}

FIGURE 4